REMARKS

Applicants have carefully reviewed and considered the Office Action mailed on February 17, 2009, and the references cited therewith. A review of the claims indicates that:

A) Claims 1, 5, 11, 12, 17, 20, 21, 25, 28, and 31 are currently amended.

B) Claims 2, 3, 7, 13, 14, 18, 24, 27, and 33 are previously canceled.

C) Claim 30 is currently cancelled.

D) No claims are newly added

In view of the following remarks, Applicants respectfully request reconsideration of the rejected claims and withdrawal of the rejections.

§ *101 Rejection of the Claims*

Claims 1, 4-6, 8-12, and 20 were rejected under 35 U.S.C. 101.

Applicants have amended claims 1, 5, 11, 12, and 20 to obviate this rejection. Claims 4, 6, and 8-10 depend directly or indirectly from respective one of amended independent claims 1, 5, 11, 12, and 20. Therefore, Applicants respectfully request to withdraw the rejection of claims 1, 4-6, 8-12, and 20.

Claims 17, 19, 21-23, and 25-26 were rejected under 35 U.S.C. 101.

Applicants have amended claims 17, 21, and 25 to obviate this rejection. Claims 19, 22, 23, and 26 depend directly or indirectly from respective one of amended independent claims 17, 21, and 25. Therefore, Applicants respectfully request to withdraw the rejection of claims 17, 19, 21-23, and 25-26.

§ 102 Rejection of the Claims

Claims 1, 4-6, 8, 10, 12, 15-17, 19, 21, 23, 25, and 28-30 were rejected under 35 USC § 102(b) over Fiocca (US Patent 5,732,391).

Independent claims 1, 5, 12, 17, 21, 25, and 28

Fiocca describes "reducing processing steps in an audio compression system using **psychoacoustic parameters**". Further, Fiocca, in abstract, describes "Complexity of an audio compression system is reduced by initially allocating some bits to frequency subbands. The initial bit allocation is based on historical signal-to-mask ratio information for the audio compression system. **The remaining bits are allocated to frequency subbands based on psychoacoustic parameters** of the audio being encoded".

Furthermore, Fiocca, in column 4, lines 50-67, describes "In step 203, **the bits that were not allocated in step 201 are allocated.** The **SMR values** calculated in step 202 remain constant for the duration of the bit allocation iterations". Furthermore, Fiocca, in column 4, lines 50-67 (steps 2-4), describes "2) **Calculate the mask-to-noise ratio (MNR)** for each subband (sb). MNR(sb)=SNR(sb)-SMR(sb). 3) Determine the subband that has the lowest MNR. 4) Increment the bit allocation for that subband". In contrast, **amended independent claims 1, 5, 12, 17, 21, 25, and 28** recite "shaping quantization noise in spectral lines in each scale band factor using local gain using a quantizer coupled to a processor in the audio encoder, wherein the local gain of the scale band factor are estimated as a function of **band energy ratios and SMRs**". Whereas, Fiocca describes "**masking to noise ratio** is used to determine where bits are allocated (Column 4, lines 50-67, steps 2 and 3)". In contrast, **amended independent claims** 1, 5, 12, 17, 21, 25, and 28 recite local gain of the scale band factor are estimated as a function of **band energy ratios** and SMRs.

Further, Fiocca, in Column 4, lines 40-49, describes "The underlying principle is that audio energy in one subband becomes far less important to the human ear if there is audio energy in adjacent subbands. The masking level calculation therefore **measures the extent that each**

subband is masked by energy in the other subbands. The entire psychoacoustic model is re-calculated each audio frame to account for the time-varying properties of the audio signal". In contrast, **amended independent claims 1, 5, 12, 17, 21, 25, and 28** recite "local gain of the scale band factor are estimated as a function of **band energy ratios** and SMRs, wherein the **energy ratios are computed by dividing energy in each band over sum of energies in all bands**".

Whereas, Fiocca describes "the sensitivity of the human ear to quantization noise in a given subband is **directly proportional to the level of audio energy** in that subband (Column 4, lines 31-35)". In contrast, **amended independent claims 1, 5, 12, 17, 21, 25, and 28** recite "the **energy ratios are computed by dividing energy in each band over sum of energies in all bands**".

Further, Fiocca, in column 4, lines 50-67, describes "2) Calculate the mask-to-noise ratio (MNR) for each subband (sb). MNR(sb)=SNR(sb)-SMR(sb). 3) Determine the subband that has the **lowest MNR**. 4) **Increment the bit allocation for that subband**". In contrast, **amended independent claims 1, 5, 12, 17, 21, 25, and 28** recite "wherein the shaping the quantization noise in each scale band factor such that a difference between SMR and SNR in each scale band factor is substantially constant". Whereas, Fiocca, describes "bits are allocated to lowest subband with MNR, after loop is run the MNR will get closer". In contrast, **amended independent claims 1, 5, 12, 17, 21, 25, and 28** recite "wherein the shaping the quantization noise in each scale band factor such that a difference between SMR and SNR in each scale band factor is **substantially constant**".

Further, Fiocca **does not describe** at least one of the following features as recited in amended independent claims 1, 5, 12, 17, 21, 25, and 28:

1. grouping spectral lines to form scale band factors by determining masking thresholds based on human perception system using a time-to-frequency transformation module of the audio encoder;
2. shaping quantization noise in spectral lines in each scale band factor using local gain using a quantizer coupled to a processor in the audio encoder, wherein **the local gain**

of the scale band factor are estimated as a function of **band energy ratios** and SMRs, wherein the shaping the quantization noise in each scale band factor such that a difference between SMR and SNR in each scale band factor is substantially constant, wherein the **energy ratios are computed by dividing energy in each band over sum of energies in all bands**; and

3. running a loop for each scale band factor to satisfy a predetermined bit allocation rate based on a bit allocation scheme using an inner loop module of the audio encoder.

Therefore, amended independent claims 1, 5, 12, 17, 21, 25, and 28 should be found allowable, and such action is respectfully requested. **Claims 4, 6, 8, 10, 15-16, 19, 23, and 29** depend directly or indirectly from the respective one of the amended independent claims 1, 5, 12, 17, 21, 25, and 28 and are allowable due to their dependence from an allowable base claim. These claims are also allowable for their own recited features that, in combination with those recited in independent claims 1, 5, 12, 17, 21, 25, and 28, are neither disclosed nor suggested in references of record, either singly or in combination with one another. Accordingly, the Applicants respectfully request that the rejection of these claims be removed.

Dependent claims 4, 10, 15

Fiocca, in Column 3, lines 30, describes "The higher the SMR, the more sensitive the human ear is to noise in that subband, and consequently, **more bits should be allocated to it**". Further, Fiocca, in Column 4, lines 42-44, describes "The calculation of the signal level is done as a direct result of the initial frequency domain transformation. The masking level calculation is, however, much more complex. The underlying principle is that audio energy in one subband becomes far less important to the human ear if there is audio energy in adjacent subbands". In contrast, **dependent claims 4, 10, and 15** recite "**assigning quantization precision to each scale band factor that is inversely in proportion to their energy content** with respect to frame energy to desensitize the scale factor bands". Whereas, Fiocca describes "**fewer bits are assigned** to subbands where surrounding subbands have more energy". In contrast, **dependent claims 4, 10, and 15** recite "**quantization precision (higher bits) is assigned** to each scale

factor band that is inversely proportional to their energy content (where surrounding subbands have more energy)".

Therefore, dependent claims 4, 10, and 15 should be found allowable, and such action is respectfully requested. Claim 16 depends directly or indirectly from the respective one of dependent claims 4, 10, and 15, all of which are patentable for the reasons presented above.

For at least the above reasons, Applicants respectfully request that the 35 U.S.C. § 102(b) rejection of claims 1, 4-6, 8, 10, 12, 15-17, 19, 21, 23, 25, and 28-29 be withdrawn.

§ *103 Rejection of the Claims*

Claims 9, 22, 26, 31 and 32 were rejected under 35 USC § 103(a) over Fiocca in view of Davidson (US Patent 6,246,345).

Fiocca describes "reducing processing steps in an audio compression system using **psychoacoustic parameters**". Further, Fiocca, in Abstract, describes "Complexity of an audio compression system is reduced by initially allocating some bits to frequency subbands. The initial bit allocation is based on historical signal-to-mask ratio information for the audio compression system. The remaining bits are allocated to frequency subbands based on psychoacoustic parameters of the audio being encoded". Further, Fiocca, in column 3, lines 13-35, describes "The filterbank 102 critically samples and outputs N subband samples for every N input time domain samples".

Furthermore, Fiocca, in Column 4, lines 50-67, describes "**Calculate the mask-to-noise ratio (MNR) for each subband (sb). MNR(sb)=SNR(sb)-SMR(sb). 3) Determine the subband that has the lowest MNR. 4) Increment the bit allocation for that subband**". Further, Fiocca, in Column 4, lines 40-49, describes "The underlying principle is that audio energy in one subband becomes far less important to the human ear if there is audio energy in adjacent subbands. The masking level calculation therefore **measures the extent that each**

subband is masked by energy in the other subbands. The entire psychoacoustic model is re-calculated each audio frame to account for the time-varying properties of the audio signal".

Davidson, in Column 4, lines 45-47, describes "the bank of filters is implemented by weighting or modulating overlapped blocks of digital audio samples with an analysis window function". Further, Davidson, Column 4, lines 30-39, describes "In FIG. 1, analysis filterbank 12 receives an input signal from path 11, splits the input signal into subband signals representing frequency subbands of the input signal, and passes the subband signals along paths 13 and 23".

In contrast, depended claims 9, 22, 26, 31 and 32 recite "shaping quantization noise in spectral lines in each scale band factor **using local gain** using the quantizer, wherein the local gain of the scale band factor are estimated as a function of **band energy ratios and SMRs**, wherein the shaping the quantization noise in each scale band factor such that a difference between SMR and SNR in each scale band factor is substantially constant, and wherein the **energy ratios are computed by dividing energy in each band over sum of energies in all bands**".

Applicants respectfully assert that Fiocca and Davidson references fail to support a *prima facie* case of obviousness because, the cited references fail to teach or suggest all of the elements of the applicants' invention, such as "calculating local gain for each band using a quantizer coupled to a processor in the audio encoder; and shaping quantization noise in each band using local gain using the quantizer, wherein the **local gain of the band are estimated as a function of band energy ratios and SMRs**, wherein the shaping the quantization noise in spectral lines in each band such that a **difference between Signal-to-Mask Ratio (SMR) and Signal-to-Noise Ratio (SNR) in each band is substantially constant**, and wherein the **energy ratios are computed by dividing energy in each band over sum of energies** in all bands; partitioning the audio signal into a sequence of successive frames; forming bands including groups of neighboring spectral lines for each frame based on critical bands of hearing; and computing local gain for each band".

For the above reasons, dependent claims 9, 22, 26, 31, and 32 should be found allowable over Fiocca and Davidson references, and such action is respectfully requested.

Allowable Subject Matter

Claims 11 and 20 were indicated to be allowable if rewritten to overcome the rejection(s) under 35 USC § 101 set forth in the Office Action.

Applicants have amended claims 11 and 20 accordingly. Therefore, claims 11 and 20 should be found allowable and such action is respectfully requested.

Conclusion

Applicants respectfully submit that the claims 1, 4-6, 8-12, 15-17, 19-23, 25, 26, 28-29, 31, and 32 are in condition for allowance and notification to that effect is earnestly requested. The Examiner is invited to telephone Applicants' attorney (603-888-7958) to facilitate prosecution of this application.

Respectfully submitted,

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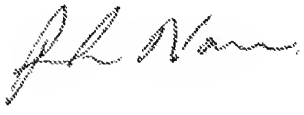
Date July 23, 2009 By 

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